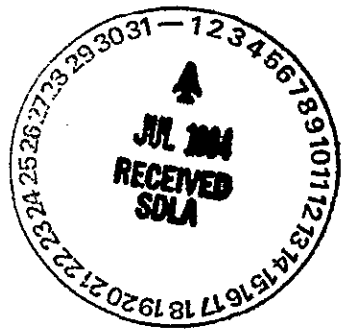
W0060-ITC-063

0045249

INTERNATIONAL TECHNOLOGY CORPORATION

Analytical Data Package Prepared For

Westinghouse Hanford



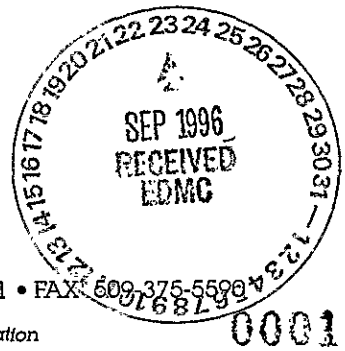
Radiochemical Analysis By

IT Analytical Services
Richland Laboratory

Sample Delivery Group Number: W0060

WHC IDENTIFICATION NUMBER	ITAS RICHLAND ID NUMBER
B0BS63	40520101

RECORD COPY



Regional Office
2800 George Washington Way • Richland, Washington 99352-1613 • 509-375-3131 • FAX: 509-375-5598

INTERNATIONAL TECHNOLOGY CORPORATION

CERTIFICATE OF ANALYSIS

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

June 30, 1994

Attention: J.A.Lerch

SAF Number	:	94-130
Date SDG Closed	:	May 17, 1994
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W0060
Data Deliverable	:	Stand Alone

I. Introduction

On May 17, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

ITAS-Richland ID	WHC ID	Matrix	Date of Receipt
405201-01A	B0BS63	Water	5/10/94

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001

III. Quality Control

The analytical results for each analysis performed under SDG W0060 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Results from the initial radioactivity screening of this sample classified it as Category I.

Samples B0BS64 and B0BS63 were received in the same cooler on May 10, 1994, and share the same Off-Site Property Control Form W94-0-0518-37. Sample B0BS64 was assigned to workorder number 405200, SDG W0049, and sample B0BS63 was assigned to workorder number 405201, SDG W0060.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The Eu-152 radiochemical yield was low for the LCS (L052011S). The LCS was recounted and the recount results are acceptable and reported. The root cause of the low yield is insufficient Eu-152 in the LCS. The Calibration Control Group has been requested to prepare the gamma water vials with higher levels of Eu-152. The Eu-152 detection limit was not met for the duplicate of sample B0BS63. The Eu-152 detection limit was achieved in both the batch blank and the sample, therefore, the results are accepted and reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual limits, except as noted above.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Suzanne Gaines
Project Manager

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060

LAB SAMPLE ID: 40520101 MATRIX: WATER

WHC ID: B0BS63 DATE RECEIVED 5/10/94

REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
CO-60	-8.16E+00	5.24E+00	5.30E+00	6.44E+00	N/A	RD3219
FE-59	-6.09E+00	1.44E+01	1.44E+01	2.55E+01	N/A	RD3219
EU-152	-1.68E+01	2.22E+01	2.22E+01	3.66E+01	N/A	RD3219
CO-58	4.89E+00	6.03E+00	6.05E+00	1.23E+01	N/A	RD3219
CS-137DA	0.00E+00	3.94E+00	3.94E+00	N/A	N/A	RD3219
RU-106DA	1.51E+01	3.14E+01	3.15E+01	6.26E+01	N/A	RD3219
EU-155	-3.02E+00	8.53E+00	8.53E+00	1.35E+01	N/A	RD3219
EU-154	-1.07E+01	1.41E+01	1.41E+01	2.18E+01	N/A	RD3219
TC-99	4.36E+01	1.49E+00	7.87E+00	2.07E+00	0.951	ITAS-IT-RS-0001

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

DUPLICATE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060

LAB SAMPLE ID: F0520101

WHC ID: B0BS63

REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER
CO-60	3.88E+00	4.39E+00	4.41E+00	1.04E+01	N/A	RD3219
FE-59	-8.89E+00	1.76E+01	1.76E+01	2.93E+01	N/A	RD3219
EU-152	2.15E+01	2.31E+01	2.32E+01	5.44E+01	N/A	RD3219
CO-58	6.69E+00	4.82E+00	4.86E+00	1.16E+01	N/A	RD3219
CS-137DA	3.16E-01	4.09E+00	4.09E+00	7.61E+00	N/A	RD3219
RU-106DA	1.06E+01	4.38E+01	4.38E+01	8.30E+01	N/A	RD3219
EU-155	9.90E+00	8.08E+00	8.14E+00	1.68E+01	N/A	RD3219
EU-154	1.61E+00	1.74E+01	1.74E+01	3.26E+01	N/A	RD3219
TC-99	4.43E+01	1.50E+00	7.94E+00	2.07E+00	0.951	ITAS-IT-RS-0001

RPD CALCULATIONS

ISOTOPE	SAMPLE RESULT	DUPLICATE RESULT	RPD
CO-60	-8.16E+00	3.88E+00	562.62
FE-59	-6.09E+00	-8.89E+00	37.38
EU-152	-1.68E+01	2.15E+01	1629.79
CO-58	4.89E+00	6.69E+00	31.09
CS-137DA	0.00E+00	3.16E-01	200.00
RU-106DA	1.51E+01	1.06E+01	35.02
EU-155	-3.02E+00	9.90E+00	375.58
EU-154	-1.07E+01	1.61E+00	270.85
TC-99	4.36E+01	4.43E+01	1.59

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INTERNATIONAL TECHNOLOGY CORPORATION

LOG #: RD-94-_____ page 1 of 2

ITAS-Richland
LABORATORY NONCONFORMANCE MEMO (NCM)

PROJECT ID (Name/Number): WHC W0060

NCM INITIATED BY (Name/Date): Marshall Lane 6/16/94

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: F0520101

MATRIX: WATER

AREA: ☐ SHIP/REC ☒ RADIOCHEM ☐ COUNTING ☐ BIOASSAY ☐ DATA VERIF ☐ REPORTING ☐ OTHER:

NONCONFORMANCE [check appropriate item(s)]:

1. ☐ Not enough sample received for proper analysis.
2. ☐ Holding time exceeded by _____ days due to:
   - 2.1. ☐ CATEGORY I: Out of Laboratory Control
     - ☐ Holding time expired at receipt.
   - 2.2 ☐ CATEGORY II: Laboratory Dependent
     - ☐ work backlog ☐ instrument failure
     - ☐ communication ☐ other (see #10)
   - 2.3 ☐ CATEGORY III: Laboratory Reruns
     - 2.3.1. ☐ *QA/QC:*
       - ☐ surrogates ☐ internal standards
       - ☐ spike recoveries ☐ blank contamination
     - 2.3.2. ☐ *CONFIRMATION:*
       - ☐ second column ☐ contamination check
       - ☐ other (see #10)
     - 2.3.3. ☐ *DILUTION:*
       - ☐ over calibration ☐ under calibration
       - ☐ other (see #10)
     - 2.3.4. ☐ *OTHER: (see #10)*
3. ☐ Sample lost during extraction/analysis; no re-prep or re-analysis possible.
4. ☐ QC data reported to client outside of:
   - ☐ method limits ☐ internal limits
   - ☐ QAPP limits ☐ contract limits
   - ☐ regulatory limits ☐ blank criteria
5. ☐ Incorrect procedure(s) used. (See #10)
6. ☐ Invalid instrument calibration. (See #10)
7. ☐ Incorrect/incomplete data reported to client. (See #10)
8. ☒ Reported detection limit(s) higher than:
   - ☐ method limits ☐ QAPP limits
   - ☒ contract limits ☐ other (see #10)

   Due to:
   - ☐ sample matrix ☐ insufficient sample
   - ☐ instrumentation ☐ other (see #10)
9. ☐ Other (specify):
10. ☒ Comments/Explanation: Eu-152 MDC Greater than CRDL

NOTIFICATION [check appropriate item(s)]:

1. ☐ Client notified by (name and date):_____
   - ☐ in writing ☐ by FAX
   - ☐ by phone ☐ Other (explain)
2. ☐ Client's name _____ and response:
   - ☐ process "as is" ☐ resample
   - ☐ on hold til ___ ☐ Other (explain)

PROJECT MANAGER (signature & date): Suzy Davies 6/30/94

FURTHER ACTION REQUIRED, SEE PAGE 2 OF 2

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IT CORPORATION

LOG #: RD-94-_____ page 2 of 2

CORRECTIVE ACTION

☑ ROOT CAUSE: INITIALS/DATE 6/16/94 nd

unknown. Fe-152 MDC was less than CRDL in both blank and original samples.

☑ CORRECTIVE ACTION: INITIALS/DATE 6/16/94 nd

Report Result And Note in case Narrative

☐ RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

☐ ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE _____

N/A

FIRST LEVEL SUPERVISOR: Nadeem Imam DATE: 6/16/94

RESPONSIBLE MANAGER: W MacKelle DATE: 6/20/94

QC REVIEW

☐ NONCONFORMANCE ☒ DEFICIENCY ☐ RERUN

☐ FURTHER ACTION REQUIRED:

ASSIGNED TO:

QC COORDINATOR: Jodie Cox DATE: 7/1/94 7/1/94

CORRECTIVE ACTION VERIFICATION

☒ VERIFIED ☐ CANNOT VERIFY (specify reason)

REASON:

NCM CLOSURE

QC COORDINATOR: Jodie Cox DATE: 7/1/94

SIGNED ORIGINAL MUST BE RETAINED IN FILE: ☐ QUALITY/OPERATIONS FILE ☒ PROJECT FILE

0013

INTERNATIONAL TECHNOLOGY CORPORATION

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LOG #: RD-94-_____ page 1 of 2

LABORATORY NONCONFORMANCE ITAS-Richland MEMO (NCM)

PROJECT ID (Name/Number): WHC W0060

NCM INITIATED BY (Name/Date): Marshall Lane 6/17/94 ml

PARAMETER(S): Gamma

SAMPLE NUMBER(S) AFFECTED: L0520115

MATRIX: WATER

AREA: ☐ SHIP/REC ☒ RADIOCHEM ☐ COUNTING ☐ BIOASSAY ☐ DATA VERIF ☐ REPORTING ☐ OTHER:

NONCONFORMANCE [check appropriate item(s)]:

1. ☐ Not enough sample received for proper analysis.
2. ☐ Holding time exceeded by _____ days due to:
   - 2.1. ☐ CATEGORY I: Out of Laboratory Control
     - ☐ Holding time expired at receipt.
   - 2.2. ☐ CATEGORY II: Laboratory Dependent
     - ☐ work backlog ☐ instrument failure
     - ☐ communication ☐ other (see #10)
   - 2.3. ☐ CATEGORY III: Laboratory Reruns
     - 2.3.1. ☒ *QA/QC:*
       - ☐ surrogates ☐ internal standards
       - ☒ spike recoveries ☐ blank contamination
     - 2.3.2. ☐ *CONFIRMATION:*
       - ☐ second column ☐ contamination check
       - ☐ other (see #10)
     - 2.3.3. ☐ *DILUTION:*
       - ☐ over calibration ☐ under calibration
       - ☐ other (see #10)
     - 2.3.4. ☐ *OTHER: (see #10)*
3. ☐ Sample lost during extraction/analysis; no re-prep or re-analysis possible.
4. ☐ QC data reported to client outside of:
   - ☐ method limits ☐ internal limits
   - ☐ QAPP limits ☐ contract limits
   - ☐ regulatory limits ☐ blank criteria
5. ☐ Incorrect procedure(s) used. (See #10)
6. ☐ Invalid instrument calibration. (See #10)
7. ☐ Incorrect/incomplete data reported to client. (See #10)
8. ☐ Reported detection limit(s) higher than:
   - ☐ method limits ☐ QAPP limits
   - ☐ contract limits ☐ other (see #10)

   Due to:
   - ☐ sample matrix ☐ insufficient sample
   - ☐ instrumentation ☐ other (see #10)
9. ☐ Other (specify):
10. ☒ Comments/Explanation: Eu-152 spike yield out OF limits

NOTIFICATION [check appropriate item(s)]:

1. ☐ Client notified by (name and date):_____
   - ☐ in writing ☐ by FAX
   - ☐ by phone ☐ Other (explain)
2. ☐ Client's name _____ and response:
   - ☐ process "as is" ☐ resample
   - ☐ on hold til ____ ☐ Other (explain)

PROJECT MANAGER (signature & date): Suzy Dawes 6/20/94

FURTHER ACTION REQUIRED, SEE PAGE 2 OF 2

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IT CORPORATION LOG #: RD-84-_____ page 2 of 2

CORRECTIVE ACTION

☒ ROOT CAUSE: INITIALS/DATE 6/17/94 mf

Insufficient Eu-152 in spike

☒ CORRECTIVE ACTION: INITIALS/DATE 6/17/94 mf

Recount spike. Eu-152 of Recount was Acceptable. Report Results.

☐ RESPONSIBILITY FOR PERFORMING CORRECTIVE ACTION ASSIGNED TO:

☒ ACTIONS TO PREVENT RECURRENCE: INITIALS/DATE 6/17/94 mf

CCG has been notified to add more Eu-152 to this vial code.

FIRST LEVEL SUPERVISOR: [signature] DATE: 6/17/94

RESPONSIBLE MANAGER: [signature] DATE: 6/27/94

QC REVIEW

☐ NONCONFORMANCE ☐ DEFICIENCY ☒ RERUN

☐ FURTHER ACTION REQUIRED:

ASSIGNED TO:

QC COORDINATOR: [signature] DATE: 7/1/94

CORRECTIVE ACTION VERIFICATION

☒ VERIFIED ☐ CANNOT VERIFY (specify reason)

REASON:

NCM CLOSURE

QC COORDINATOR: [signature] DATE: 7/1/94

0015

SIGNED ORIGINAL MUST BE RETAINED IN FILE: ☐ QUALITY/OPERATIONS FILE ☒ PROJECT FILE

Surveyed : Yes ✓ No ____? Less than 200 counts/minute: Yes ✓ No ____? By (initials) [signature]

Pacific Northwest Laboratories Battelle Boulevard Richland, Washington 99352	**CHAIN OF CUSTODY**	Test User ID: BATTM16729 C-of-C: B013D1 pg. 1 of 1

Company Contact: BE OPITZ Telephone: (509) 372-0089

Samples Collected by: HANKEL / HARRISON Date: 5-6-94 Time: 830

ID/Sample No.: B0BS63

Ice Chest No.: E12-11 Field Logbook Page No.: 4/865

Remarks: SAF 94-130

Possible Sample Hazard Identification: ____ Contract No.: ____

Destination: DELIVER TO SIGMA 5 (WHC Contract) Carrier/Waybill No.: ____

Ground-Water X Soil ____ Other ____

Shipping container internal temperature when samples sealed in it ____. Shipping container internal temperature when opened in laboratory ____.

Sample Identification

B0BS63 -(8) 1000mlP-GAMM
B0BS63 -(2) 1000mlP-TC99 > 40520101

SDA
WOOCO

Chain of Possession

[signature] ANC Relinquished by:	[signature] PNL Received by:	1220 5/6/94 Date/Time:
O Mueller for TLV PNL Relinquished by:	L Sweeney WHC Received by:	5-10-94 - 0700 Date/Time:
L Sweeney WHC Relinquished by:	R. Boyd H Received by:	5-10-94 1145 Date/Time:
Relinquished by:	Received by:	Date/Time:
Disposed by:	Disposal Method:	Date/Time:

PNL-MA-567, AD2 BD-1200-345 (12/92)

SAMPLE ANALYSIS ORDER
BATTELLE, PNL

ITAS

CONTRACT_____
CHAIN OF CUSTODY #: B013D1
SAMPLE ID(S): B0BS63
SAMPLE SCHEDULE DATE: 04/01/94
USER ID BATTM16229

SAF94-130

SAMPLE RECEIVER INITIAL / DATE:
_____ / DATE_____

WATER_X_ SOIL___ OTHER___

INTERNAL TEMPERATURE OF SHIPPING CONTAINER
UPON OPENING IN LABORATORY_____

BOTT#	BOTT TYPE	BOTT SIZE	# of BOTT	PRESERVAT	NOTES	# of SAMP	ANA_1	ANA_2	ANA_3	ANA_4	ANA_5	ANA_6	Filtered
123	P	1000	1	HNO3		8 +	GAMM						
							GAMMA SCAN	98 4/19/94					
313	P	1000	1	HNO3		2 +	TC99						
							TC-99						

0019

SAMPLE STATUS REPORT FOR E 6028. E-BLANK 2-E33-30 TIME: 5/ 6/94 14:56
DISPATCHED: 3/30/94 11:48 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/ 6/94 12:41

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	VOGEL

END OF REPORT

BOBR73
BOBR74
BOBR75
BDBR76
LCS
5/10/94

BOBS63
LCS
5/10/94

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WHC		WSI-L-0518-37

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
ER Eng Support	Field & Analytical Supp	ER Field Sampling

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☒ Contractor ☐ Vendor

Shipped to
IT Analytical Services
2800 George Washington Way
Richland, WA 99352

Off-site Custodian

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 74 lbs.	Sample #: PUBSL3, PUBSL4 Cooler ID: EF-11 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs.	Sample #: Cooler ID: NA Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the 300 AREA

Bill of lading # NONE

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No	Date
[signature]	157792	5/10/94

Location of Property (Area & Bldg.)	Contact	Phone
200-BP-5	P. H. Butcher	(509) 376-4388

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
5-10-94	88410 PLS3A	NA

Originated By	Date	Authorized By	Date
P H Butcher	5/10/94	P H Butcher	5-10-94
Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[signature]	5/10/94

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
R. Boyd JT				
Date 5-10-94 1145				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to:
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Yellow – Retain Green – Property Control Custodian (Issuing Office) Pink – Originator

0021

54-3000-479 (09/89)

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
3800 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-10-94 1145 Client Name WHC

Project/Client # ~~SAF~~ 94-130 Batch or Case # _____

Cooler ID (if noted on the outside of cooler) ER-11

1. Condition of shipping container? OK
2. Custody Seals on cooler intact? Yes ☑ No ☐
3. Custody Seals dated and signed? Yes ☑ No ☐
4. Chain of Custody record is taped on inside of cooler lid? Yes ☑ No ☐
5. Vermiculite/packing material is: Wet ☐ Dry ☑
6. Each sample is in a plastic bag? Yes ☑ No ☐
7. Number of sample containers in cooler: 20
8. Samples have: _____ tape _____ hazard labels
   X custody seals X appropriate sample labels
9. Samples are: X in good condition _____ leaking
   _____ broken _____ have air bubbles
   _____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 3°

11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #'(s) B01301, B01302
    Request for analysis #(s) N/A
    Airbill # N/A Carrier N/A
12. Have any anomalies been identified above? Yes ☐ No ☑
13. Memos have been initiated for all anomalies identified above? Yes ☐

Printed Name/Signature R. Boyd R. Boyd Date/Time 5-10-94 1145

FORM NO. LS-042, Rev.0, 2/94

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER:_____ DATE INITIATED: 5-10-94

INITIATED BY: Heidelberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT:_____

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
B0BS64	B013D2	γ, TC
B0BS63	B013D1	γ, TC

Samples were received with the following deficiencies:

☐ 1. Not enough sample received for proper analysis.
☐ 2. Sample received without proper preservative.
☐ 3. No sample received in container.
☐ 4. Sample received without a RFA/COC form.
☐ 5. No sample ID on container.
☐ 6. Sample received broken or leaking.
☐ 7. Holding time exceeded at receipt.
☐ 8. Custody tape broken.
☐ 9. COC not relinquished by client.
☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  ☐ RFA/COC received
  ☐ RFA/COC not received
☒ 12. Other (Explain below).

NOTES: COC's Came with Dest user ID of M16729 and SAF 94-130. Will log as WHC 94-130.

SUPERVISOR REVIEW:_____

PROJECT MANAGER REVIEW:_____

TELEPHONED TO: Joan Kessner ON 5/10 BY Van Petrey

TELEFAXED TO:_____ ON_____ BY_____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

TENNELEC #1

SCREENING CALCULATION SPREADSHEET

All are Category 1.
JRN 11 May 94

Customer Code	Recieved Date	Time	Screening Prep Date	Time	Count Date	Mnts. Cntd	BACKGROUND Alpha	Beta	Mnts
BAT			51094		510	10	15	214	240

Customer ID BAT/WATER	pH <2 Rcvd/Relq	RESIDUE Wght (mGrms)	Vol. Anal. mG mL	Sample Size Gm L	SMPLE CNT DATA Hldr Num.	Total Alpha	Counts Beta	Net Sample Counts/Minute Alpha	Beta	DPM / Aliqout Alpha	Beta	uCi per Sample Alpha	Beta	2 Sigma Error uCi per Sample Alpha	Beta	pCi/(Gm or L) Alpha	Beta	Catagory 1 Yes/No	Aliquot to Cat 1 Gm or Ltr Alpha	Beta
B0BS63		9.4	5	1.0	6	5	9	0.44	0.01	2.0E+00	-3E-01	1.8E-04	-3E-05	1.9E-07	-3E-08	1.8E+02	-3E+01	Yes	5.6E+01	-4E+03
B0BS64		4.6	5	1.0	7	2	35	0.14	2.61	4.9E-01	5.5E+00	4.4E-05	5.0E-04	9.2E-08	2.1E-07	4.4E+01	5.0E+02	Yes	2.3E+02	2.0E+02
B0BRQ5		4.1	5	1.0	8	0	13	-0.06	0.41	-3E-01	9.2E-01	-2E-05	8.3E-05	-6E-08	2.7E-07	-2E+01	8.3E+01	Yes	-4E+02	1.2E+03
B0BRN7		8.1	5	1.0	9	0	14	-0.06	0.51	-3E-01	1.1E+00	-3E-05	1.0E-04	-7E-08	3.5E-07	-3E+01	1.0E+02	Yes	-4E+02	9.7E+02
B0BRP9		7.0	5	1.0	10	1	8	0.04	-0.09	1.7E-01	-2E-01	1.5E-05	-2E-05	4.9E-08	-5E-08	1.5E+01	-2E+01	Yes	6.7E+02	-5E+03
B0BWB1		7.1	5	1.0	11	0	10	-0.06	0.11	-3E-01	2.8E-01	-2E-05	2.5E-05	-6E-08	4.3E-08	-2E+01	2.5E+01	Yes	-4E+02	4.0E+03
B0BW98		7.5	5	0.1	12	1	21	0.04	1.21	1.2E-01	2.6E+00	1.1E-06	2.3E-05	4.9E-09	2.8E-07	1.1E+01	2.3E+02	Yes	9.0E+02	4.3E+02
B0BW59		1.4	5	0.1	13	1	15	0.04	0.61	1.3E-01	1.3E+00	1.2E-06	1.1E-05	4.5E-09	9.4E-08	1.2E+01	1.1E+02	Yes	8.6E+02	8.7E+02
B0BW60		2.6	5	0.1	14	1	16	0.04	0.71	1.3E-01	1.5E+00	1.2E-06	1.3E-05	4.6E-09	1.2E-07	1.2E+01	1.3E+02	Yes	8.6E+02	7.4E+02
B0BWH3		6.2	5	4.0	15	2	17	0.14	0.81	5.6E-01	1.6E+00	2.0E-04	5.9E-04	3.8E-07	1.3E-06	5.1E+01	1.5E+02	Yes	2.0E+02	6.7E+02
B0BWJ0		1.6	5	4.0	16	1	16	0.04	0.71	1.3E-01	1.5E+00	4.5E-05	5.4E-04	1.8E-07	4.9E-06	1.1E+01	1.3E+02	Yes	8.8E+02	7.5E+02
B0BWG8		4.4	5	4.0	17	0	14	-0.06	0.51	-3E-01	1.1E+00	-1E-04	4.1E-04	)2E-07	1.5E-06	-2E+01	1.0E+02	Yes	-4E+02	9.8E+02
B0BWG6		1.2	5	4.0	18	0	9	-0.06	0.01	-2E-01	5.9E-02	-9E-05	2.1E-05	-2E-07	1.5E-08	-2E+01	5.3E+00	Yes	-5E+02	1.9E+04
B0BWH4		2.7	5	1.0	19	1	9	0.04	0.01	1.5E-01	-7E-03	1.4E-05	-7E-07	4.6E-08	-7E-10	1.4E+01	-7E-01	Yes	7.3E+02	-2E+05
B0BWH6		3.1	5	1.0	20	2	10	0.14	0.11	5.6E-01	1.4E-01	5.0E-05	1.3E-05	9.0E-08	1.1E-08	5.0E+01	1.3E+01	Yes	2.0E+02	8.0E+03
TOTAL	uCi							-0.06	-0.89	-2E-01	-2E+00	2.9E-04	2.3E-03	ERR	ERR	ERR	ERR	Yes	ERR	ERR

*** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD 11-May-1994
Page 1

CUSTOMER: WHC SAF 94-130 SAMPLE DELIVERY GROUP W0060

MATRIX : WATER BATCH NUMBER 5-201

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	L0520118 V				
	L0520115 V				
1)	40520101 V		WHC	B0BS63	
	F0520101				

ACTIONS (Initial & Date)

) INITIATED JH 5/12/94

) PREP LAB RECEIVED [illegible] 6-10-94

) SAMPLE REMAINDER STORED [illegible] 6-13-94

) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB OD 6/13/94

6) DATA REVIEWED AND ANALYTICAL PREP STORED [illegible] 6/17/94

INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE _____

REANALYSIS / RECOUNT

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Gamma

NAME/DATE nd / ~~6/15/94~~ 6/15/94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0060

MATRIX Water

BATCH NUMBER 5-201

ITAS ID	CUSTOMER ID	COMMENTS
1) L0520115	N/A	Reagent Spike
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

REFERENCED QC

ITAS ID - BLANK _____

ITAS ID - SPIKE _____

CLIENT CODE _____

ACTIONS (Initial & Date)

PREP LAB RECEIVED _____

SAMPLE REMAINDER
RETURNED TO SCG _____ ☐ (CHECK ONE)

NO SAMPLE REMAINING ☐

SEPARATION LAB _____

COUNTING/MEASUREMENT _____

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT MC 6-15-94

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

RC-048 12/92 REV 2

*** TC-99 ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994
Page 1

CUSTOMER: WHC SAF

SAMPLE DELIVERY GROUP W0020

MATRIX : WATER 94-130

BATCH NUMBER 5-201

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
					EQNI 232 - 300.12 ± 3.7085 DPM
	L0520111N L0520121N		L0520111B	L0520111M	F0520101 W0520101 - EQNI 231 - 300.58 ± 3.7141 DPM
1)	40520101		WHC	B0BS63	

ACTIONS (Initial & Date)

1) INITIATED JH 5/12/94

2) PREP LAB RECEIVED 6/14/94 MM

3) SAMPLE REMAINDER STORED NA

4) SEPARATION LAB RECEIVED 6/14/94 MM

5) COUNTING/MEASUREMENT LAB 17 Jun 94 OA

6) DATA REVIEWED AND ANALYTICAL PREP STORED GR 6/22/94

Los Alamos Technical Associates, Inc.

8633 Gage Blvd. / Kennewick, WA 99336 / Telephone (509) 783-4369 / FAX (509) 783-9661

August 16, 1994

Karl Pool
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

Dear Karl,

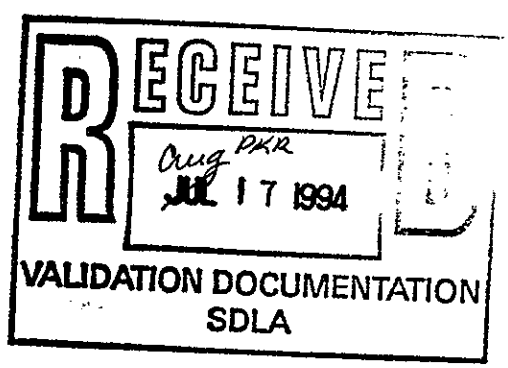
Attached is the data validation report for analytical results for 200BP-5 Groundwater Operable Unit (SDG W0060-ITC-063). The package was received by Los Alamos Technical Associates on July 26, 1994. Validation of this package began on August 15, and was completed on August 16, 1994.

If you have any questions, please let me know.

Sincerely,

Janet Jones
Senior Environmental Engineer

cc: Chris Haecker, LATA
VW402.54 file



DATA VALIDATION REPORT
for
200-BP-5 Groundwater Operable Unit
SDG W0060-ITC-063
LATA VW402.54

Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

August 16, 1994

Table of Contents

200-BP-5 Groundwater Operable Unit
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) W0060-ITC-063 were validated at level "D" as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002) and Data Validation Procedures for Radiochemical Analyses (WHC-SD-EN-SPP-001).

The data package was received by Los Alamos Technical Associates (LATA) on July 26, 1994. Validation began on August 15, 1994 and was completed on August 16, 1994.

The radiochemical analyses were performed by International Technology Corporation, ITAS.

ANALYSES REQUESTED

One (1) water sample numbered BOBS63 was collected on May 6, 1994 by WHC and transferred to International Technology Corporation (ITC) for analysis. The following determinations were conducted on the sample in this SDG:

Technetium-99	Method ITAS-IT-RS-0001
Gamma Spectrometry	Method ITAS-RD-3219

DATA QUALITY OBJECTIVES

The data quality objectives for 200-BP-5 Groundwater Operable Unit are specified in the *Quality Assurance Program Plan for the 200-BP-5 Groundwater Operable Unit* (DOE/RL 88-32, Rev. 1). Precision, accuracy, and detection limit requirements for the project have been derived from *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses* (EPA 1989a).

The primary objective of the data validation effort was to ensure these data quality objectives were met, and that the data are usable and defensible. This was accomplished through a detailed examination of the data package to recreate the analytical process and verify that proper and acceptable analytical techniques had been applied. The data package was checked for correct submission of required deliverables, correct transcription of raw data to the summary forms, and for proper calculation of a number of parameters. Data qualifiers are assigned to any results that have been determined to be deficient. These are discussed below.

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

DATA QUALITY OBJECTIVES (cont.)

Sample Result Verification. All sample results were supported in the raw data.

Detection Limits. Detection limit goals were met for all samples.

Completness. No results were rejected, the data is 100% complete.

Data qualifiers are assigned to any results that have been determined to be deficient. These are discussed below.

MAJOR DEFICIENCIES (REJECTED DATA)

* No major deficiencies were identified during validation which required qualification of data as unusable.

MINOR DEFICIENCIES

* No minor deficiencies were identified during validation which required qualification of data.

COMMENTS

* There was no evidence that the pH is being checked before the analysis of the samples.

* There is no VEDD (Validation Electronic Data Deliverable) included with this package due to the fact that no qualifications were made or changed by the validator.

REFERENCES

EPA *USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses,* EPA 1989a, U.S. Environmental Protection Agency, Washington, D.C.

WHC 1993, *Data Validation Procedures for Chemical Analyses,* WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

WHC 1993, *Data Validation Procedures for Radiochemical Analyses,* WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

WHC 1994, *Quality Assurance Program Plan for the 200-BP-5 Groundwater Operable Unit,* DOE/RL 88-32, Rev. 1, Department of Energy-Hanford, Richland, Washington.

DATA VALIDATION APPLIED QUALIFIERS

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

JN- Indicates a tentatively identified compound (TIC) that has been determined to be valid in terms of identification and quantitation.

UJN- Indicates a tentatively identified compound (TIC) that has been determined to be presumptive and valid (JN) in terms of identification and quantitation and has been qualified as undetected (U) due to associated blank contamination.

NJ- Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific application (i.e., usable for decision making purposes).

N- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision making purposes).

LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

Organic Data Qualifiers

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

J- Indicates an estimated value. This flag is used when estimating concentrations of tentatively identified compounds (TICs) or when the presence of a TCL compound is confirmed at a concentration of less than the CRQL but greater than the IDL.

N- Indicates presumptive evidence of a compound. This flag is used only by the laboratory for TIC results when the identification is based on a mass spectral library search.

P- This flag is used for pesticide/Aroclor target analytes when there is greater than 25% difference for detected values between the quantitation and confirmation GC columns. The lower of the two concentrations is reported on the report form and the result is flagged with a "P".

C- This flag applies to pesticide results where the identification has been confirmed by GC/MS. This flag should not be used by the laboratory if GC/MS confirmation was attempted but unsuccessful, in which case, the laboratory should use an "X" flag as defined below. The "X" flag is then defined in the SDG narrative.

B- This flag applies to results in which the analyte was detected in both the sample and the associated blank. The combination of the "B" flag with the "U" flag ("BU" or "UB") is expressly prohibited in the analytical SOW.

E- This flag identifies compounds whose concentrations exceed the calibrated range of the GC/MS instrument.

D- This flag identifies compounds identified in an analysis at a secondary dilution factor.

A- Indicates a TIC which is a suspected aldol-condensate product.

X- This is a non-specific flag used to properly define the results. If used, this flag must be properly defined within the body of the SDG.

LABORATORY APPLIED QUALIFIERS

Inorganic Qualifiers

U- Indicates the analyte was analyzed for but not detected in the sample.

B- Indicates the analyte concentration is less than the CRDL but greater than the IDL.

E- Indicates the value reported is estimated due to the presence of interference.

M- Indicates duplicate injection precision criteria were not met during graphite furnace (GFAA) analysis.

N- Indicates spiked sample recovery was not within the control limits.

S- Indicates the reported value was determined by the Method of Standard Additions (MSA).

W- Indicates post-digestion spike for GFAA analysis is outside control limits and the sample absorbance is less than 50% of the spike absorbance.

*- Indicates duplicate analysis was not within control limits.

+- Indicates the correlation coefficient (r) for the MSA was less than 0.995.

Data Qualification Summary

DATA QUALIFICATION SUMMARY TABLE
200-BP-5 GROUNDWATER OPERABLE UNIT
WOO60-ITC-063

Qualifications Made by Validator

Constituent	Qualifier	Sample	Reason
Cobalt-60	none	N/A	N/A
Iron-59	none	N/A	N/A
Europium-152	none	N/A	N/A
Cobalt-58	none	N/A	N/A
Cesium-137DA	none	N/A	N/A
Ruthenium-106D	none	N/A	N/A
Europium-155	none	N/A	N/A
Europium-154	none	N/A	N/A
Technetium-99	none	N/A	N/A

Data Summary Tables

RADCHEMISTRY DATA SUMMARY

FILE #:VW402.54		HEIS #:	B0BS63		
		Date:	6-May-94		
		Matrix:	WATER		
Constituent	CAS #	Units	Results	Q	MDA
Cobalt-60	10198-40-0	pCi/L	-8.16	U	6.44
Iron-59	14596-12-4	pCi/L	-6.09	U	25.5
Europium-152	14683-23-9	pCi/L	-16.8	U	36.6
Cobalt-58	13981-38-9	pCi/L	4.89	U	12.3
Cesium-137DA	10045-97-3	pCi/L	0	U	N/A
Ruthenium-106D	13967-48-1	pCi/L	15.1	U	62.6
Europium-155	14391-16-3	pCi/L	-3.02	U	13.5
Europium-154	15585-10-1	pCi/L	-10.7	U	21.8
Technetium-99	14133-76-7	pCi/L	43.6		2.07

entered by: C.S.
date: 8/16/94

Shaded areas indicate changes by the validator
ITC063

checked by: MF
date: 8/16/94

Sample Results (Form I's)

IT ANALYTICAL SERVICES
RICHLAND, WA
(509) 375-3131

SAMPLE RESULTS

LAB NAME: ITAS-RICHLAND SDG NO.: W0060

LAB SAMPLE ID: 40520101 MATRIX: WATER

WHC ID: B0BS63 DATE RECEIVED 5/10/94

REPORTING UNITS pCi/L

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	YIELD	METHOD NUMBER	
CO-60	-8.16E+00	5.24E+00	5.30E+00	6.44E+00	N/A	RD3219	U
FE-59	-6.09E+00	1.44E+01	1.44E+01	2.55E+01	N/A	RD3219	U
EU-152	-1.68E+01	2.22E+01	2.22E+01	3.66E+01	N/A	RD3219	U
CO-58	4.89E+00	6.03E+00	6.05E+00	1.23E+01	N/A	RD3219	U
CS-137DA	0.00E+00	3.94E+00	3.94E+00	N/A	N/A	RD3219	U
RU-106DA	1.51E+01	3.14E+01	3.15E+01	6.26E+01	N/A	RD3219	U
EU-155	-3.02E+00	8.53E+00	8.53E+00	1.35E+01	N/A	RD3219	U
EU-154	-1.07E+01	1.41E+01	1.41E+01	2.18E+01	N/A	RD3219	U
TC-99	4.36E+01	1.49E+00	7.87E+00	2.07E+00	0.951	ITAS-IT-RS-0001	

MW 4-15-94

Checklists

VW 402.54

LATA RADIOCHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	(D)	E

PROJECT: 200-BP-5		DATA PACKAGE: W0060-ITC-063
VALIDATOR: MWebb	LAB: ITC	DATE: 8-15-94
CASE: SAF 94-130		SDG:
QAPP REFERENCE:		SAP REFERENCE:

If there is no QAPP or SAP reference, contact the WHC Technical Representative.
If the document(s) are not provided, default to the Method acceptance criteria.

ANALYSES PERFORMED

☐ Gross Alpha ☐ Gross Beta	☐ Strontium-89 ☐ Strontium-90	☒ Technetium-99	☐ Isotopic Anal. Alpha Spec.	☒ Gamma Spectroscopy	☐ Iodine-129
☐ Total Uranium (KPA)	☐ Radium-226 ☐ Radium-228	☐ (LSC) Liquid Scintillation	☐	☐	☐

SAMPLES/MATRIX B0B563 (Water)

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification forms present?	(Yes)	No	N/A
Compliance screening form present?	(Yes)	No	N/A
Is a case narrative present?	(Yes)	No	N/A
Were all analyses requested reported?	(Yes)	No	N/A
Are all results supported in the raw data?	(Yes)	No	N/A

Comments:

2. CHAIN-OF-CUSTODY/HOLDING TIMES

Are sample holding times acceptable?	(Yes)	No	N/A
Are samples preserved correctly?	according to COC (Yes)	No	N/A
Was the pH of the sample checked prior to analysis?	Yes	(No)	N/A

Comments:

No evidence of pH being checked before samples were analyzed.

8/16/94 MWF

3. INITIAL CALIBRATION

Instruments/detectors calibrated within one year of sample analysis? Yes (No) N/A
Initial calibration acceptable? . . . . . (Yes) No N/A
Standards NIST traceable? . . . . . (Yes) No N/A
Standards Expired? . . . . . Yes (No) N/A
Comments: Cont. Calibration accepted. Fact that the detector was not re-calibrated w/i one year has no effect on the data. 9-7-94

4. CONTINUING CALIBRATION

Background checked at proper frequency? . . . . . (Yes) No N/A
Background check acceptable? . . . . . (Yes) No N/A
Efficiency checked at proper frequency? . . . . . (Yes) No N/A
Efficiency check acceptable? . . . . . (Yes) No N/A
Calibration check standards NIST traceable? . . . . . (Yes) No N/A
Calibration check standards expired? . . . . . Yes (No) N/A
Comments:

5. BLANKS *(see BLANK AND SAMPLE DATA SUMMARY form)*

Method blank analyzed? . . . . . (Yes) No N/A
Method blank results acceptable? . . . . . (Yes) No N/A
Analytes detected in method blank? . . . . . Yes (No) N/A
Transcription/Calculation Errors? . . . . . Yes (No) N/A
Comments:

8/16/94 MEG

6. MATRIX SPIKES *(see ACCURACY DATA SUMMARY form)*

Matrix spike analyzed?	(Yes)	No	N/A
Spike recoveries acceptable?	(Yes)	No	N/A
Spike source traceable?	(Yes)	No	N/A
Spike source expired?	Yes	(No)	N/A
Transcription/Calculation Errors?	(Yes)	(No)	N/A

yes MW

★

Spike Recovery

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:
SSR = spiked sample result
SR = sample result
SA = spike added

Comments: TQ95 $\frac{304.8 - 43.57}{270.793} = .965$ OK (96.5%)

laboratory calc. the MS using the duplicate value

7. LABORATORY CONTROL SAMPLES *(see ACCURACY DATA SUMMARY form)*

LCS analyzed?	(Yes)	No	N/A
LCS recoveries acceptable?	(Yes)	No	N/A
LCS traceable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	(No)	N/A

★

Recovery

$$\%R = \frac{observed\ value}{true\ value} \times 100$$

Comments:

8. **CHEMICAL RECOVERY** *(see ACCURACY DATA SUMMARY form)*

Chemical carrier added?	(Yes)	No	N/A
Chemical recovery acceptable?	(Yes)	No	N/A
Tracer added?	Yes	No	(N/A)
Tracer recovery acceptable?	Yes	No	(N/A)
Standards traceable?	(Yes)	No	N/A
Standards expired?	Yes	(No)	N/A
Transcription/Calculation errors?	Yes	(No)	N/A

★

Alpha Spec Tracer Recovery

$$\frac{A - B}{(2.22)(E)(T)}$$

where:

A = *gross counts per minute*
B = *background counts per minute of tracer*
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
T = *activity (pCi) of tracer added to sample (can be determined by taking dpm of tracer added divided by* 2.22)

Comments: _____

9. **DUPLICATES** *(see PRECISION DATA SUMMARY form)*

Duplicates Analyzed?	(Yes)	No	N/A
RPD Values Acceptable?	(Yes)	No	N/A
Transcription/Calculation Errors?	Yes	(No)	N/A

★

Relative Percent Difference

$$RPD = \frac{|S - D|}{\left(\frac{S + D}{2}\right)} \times 100$$

where:

S = *sample concentration (original sample/MS)*
D = *duplicate concentration (duplicate sample/MSD)*

Comments: _____

8/16/94 MMG

10. FIELD QC SAMPLES

Field blank(s) identified?	Yes	(No)	N/A
Field blank results acceptable?	Yes	No	(N/A)
Analytes detected in field blank(s)?	Yes	No	(N/A)
Field duplicate sample(s) identified?	Yes	(No)	N/A
Field duplicate RPD values acceptable?	Yes	No	(N/A)
Field split sample(s) identified?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Performance audit sample(s) identified?	Yes	(No)	N/A
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments:

11. DETECTION LIMITS (LEVELS D & E)

MDA's meet required detection limits?	(Yes)	No	N/A
Transcription/calculation errors?	Yes	(No)	N/A

★

Minimum Detectable Activity (MDA)

$$\frac{4.66 \times \sqrt{(B)(T)}}{2.22(E)(I)(R)(D)(V)(Y)(T)}$$

where:

- B = *background counts per minute (cpm) or the reported standard deviation of the background (S) cpm*
- T = *counting time for associated sample*
- 2.22 = *conversion dpm/pCi*
- E = *detector efficiency*
- I = *ingrowth correction factor (if applicable or 1)*
- R = *carrier recovery factor (if applicable or 1)*
- D = *decay factor (if applicable or 1)*
- Y = *chemical yield factor (if applicable or 1)*
- V = *sample volume in liters or grams*

Comments: MDA of Eu152 not met for deep gamma scan

8/16/96 MJ

Results Calculation Equations

Gross α/β and Tritium

$$\frac{(A - B) \times C}{(2.22)(E)(V)}$$

where:

A = *gross counts per minute*
B = *background counts per minute*
C = *activity of α fraction in β channel**
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
V = *sample volume, liters or grams*

**if for calculation of gross β, otherwise substitute* 1

Strontium (total)

$$\frac{A - B}{(2.22)(E)(I)(D)(R)(V)}$$

where:

A = *gross counts per minute*
B = *background counts per minute*
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
I = *ingrowth correction factor*
R = *carrier recovery factor*
D = *strontium decay factor*
V = *sample volume, liters or grams*

Strontium-90 (corrected for Sr-89)

$$\frac{A - B}{(2.22)(Y)(E)(I)(D)(R)(V)}$$

where:

A = *gross counts per minute*
B = *background counts per minute*
Y = *yttrium-90 yield factor*
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
I = *ingrowth correction factor*
R = *strontium-89 yield factor*
D = *strontium decay factor*
V = *sample volume, liters or grams*

8/16/94 my

Results Calculation Equations, continued

Technetium-99

$$\frac{A - B}{(2.22)(E)(R)(V)}$$

where:

A = *gross counts per minute*
B = *background counts per minute*
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
R = *carrier recovery factor*
V = *sample volume, liters or grams*

Alpha Spec Isotopes

$$\frac{A - B}{(2.22)(E)(R)(V)}$$

where:

A = *gross counts per minute for isotope*
B = *background counts per minute for detector*
2.22 = *conversion factor, dpm/pCi*
E = *detector efficiency*
R = *tracer recovery factor*
V = *sample amount, liters or grams*

Gamma Spec Isotopes

$$\frac{A}{(2.22)(B)(D)(E)(V)(T)}$$

where:

A = *peak area for isotope*
D = *decay factor for isotope*
2.22 = *conversion factor, dpm/pCi*
B = *abundance factor for isotope*
E = *efficiency factor for isotope*
V = *sample amount, liters or grams*
T = *live time (minutes)*

8/16/94 mg

Results Calculation Equations, continued

Total Uranium by Laser Fluorometry

$$\frac{(WF - I)(R)(D)}{WU - WF}$$

where:

WF = *sample reading with Fluran*
I = *initial sample reading*
R = *concentration of uranium standard after dilution with sample* ($\mu g/L$)
D = *dilution factor*
WU = *sample reading with uranium standard*

Radium-226 by Radon Emanation

$$D = \frac{C}{(2.22)(E)(V)} \times \frac{1}{1 - e^{-\lambda t_1}} \times \frac{1}{e^{-\lambda t_2}} \times \frac{t_3}{1 - e^{-\lambda t_3}}$$

where:

C = *net count rate, cpm*
E = *calibration constant of the de-emanation system and the scintillation cell in counts per minutes/disintigrations per minute of radon-222*
V = *sample aliquot in liters*
t_1 = *the elapsed time in days between the first and second de-emanations, and* λ *is the decay constant for radon-222* ($0.181\ d^{-1}$)
t_2 = *the time interval in hours between the second de-emanation and counting, and* λ *is the decay constant of radon-222* ($0.00755 hr^{-1}$)
t_3 = *the counting time in minutes, and* λ *is the decay constant of radon-222* ($1.26 \times 10^{-4}\ \text{min}^{-1}$)
2.22 = *conversion factor, dpm/pCi*

8/16/94 MG

Validator	Date	SDG
MC Webb	8-16-94	W0060-ITC-063

DATA VALIDATION SUMMARY

MAJOR DEFICIENCIES:

1. None

MINOR DEFICIENCIES:

1. None

COMMENTS:

1. There is no evidence that the pH is being checked before the analysis of the samples.

MATRIX SPIKE RECOVERY (MS)

Analysis: Radiochemistry
SDG: W0060-ITC-063
Sample # see below

Date: 16-Aug-94
Validator: MC Webb

Constituent	Spike Sample Result SSR	Sample Result SR	Spike Added SA	%R
Tc99 BOBS63	304.80	43.57	270.79	96.5%
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
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				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!

0000024

PERCENT RECOVERY (LCS)

Analysis: Radiochemistry
SDG: WOO60-ITC-063

Date: 16-Aug-94
Validator: MC Webb

Constituent	Observed value OLCS	True value ALCS	%R
Tc99	205.40	270.38	76.0%
GEA Cs137DA	96.64	99.28	97.3%
GEA Co60	63.95	49.71	128.6%
GEA Eu152	118.00	99.38	118.7%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
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			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

RELATIVE PERCENT DIFFERENCE

Analysis: Radiochemistry
SDG: WOO60-ITC-063

Date: 16-Aug-94
Validator: MC Webb

Constituent	Original (Sample) concentration OS	Duplicate concentration D	RPD
GEA Eu15 BOBS63	undetected	undetected	NC
GEA Cs137DA BOBS63	undetected	undetected	NC
GEA Co60 BOBS63	undetected	undetected	NC
Tc99 BOBS63	43.57	44.29	1.6%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
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			#DIV/0!
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			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

920000

RESULTS CALCULATION TECHNETIUM-99

Analysis: Radiochemistry
SDG: W0060-ITC-063

Date: 16-Aug-94
Validator: MC Webb

Constituent	DPM of the sample	DPM of the blank	Decay Factor	Yield	Sample volume (L or g)	Result
	A.6	B.6	E.6	R.6	V.6	
BOBS63	71.560	25.570	1.000	0.95	0.500	43.5672
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!
						#DIV/0!

MINIMUM DETECTABLE ACTIVITY (MDA)

Analysis: Radiochemistry
SDG: WOO60-ITC-063

Date: 16-Aug-94
Validator: MC Webb

Constituent	Background counts per minute (cpm) or Standard Deviation of background (cpm)	Counting time for associated sample	Detector Efficiency	Ingrowth correction factor	Carrier recovery factor	Decay factor	Chemical yield factor	Sample volume (L or g)	MDA
	B.2	T.2	E.2	I.2	R.2	D.2	Y.2	V.2	
Tc99 BOBS63	24.250	125.000	1.054	1.000	0.951	1.000	1.000	0.500	2.067
									#DIV/0!
									#DIV/0!
									#DIV/0!
									#DIV/0!
									#DIV/0!
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									#DIV/0!

Laboratory Case Narratives

INTERNATIONAL TECHNOLOGY CORPORATION

CERTIFICATE OF ANALYSIS

Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352

June 30, 1994

Attention: J.A.Lerch

SAF Number	:	94-130
Date SDG Closed	:	May 17, 1994
Number of Samples	:	One (1)
Sample Type	:	Water
SDG Number	:	W0060
Data Deliverable	:	Stand Alone

I. Introduction

On May 17, 1994, one water sample was received by ITAS-Richland for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the WHC specific ID:

ITAS-Richland ID	WHC ID	Matrix	Date of Receipt
405201-01A	B0BS63	Water	5/10/94

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Gamma Spectroscopy
Gamma Scan by method ITAS-RD-3219
Liquid Scintillation Counting
Technetium-99 by method ITAS-IT-RS-0001

III. Quality Control

The analytical results for each analysis performed under SDG W0060 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Results from the initial radioactivity screening of this sample classified it as Category I.

Samples B0BS64 and B0BS63 were received in the same cooler on May 10, 1994, and share the same Off-Site Property Control Form W94-0-0518-37. Sample B0BS64 was assigned to workorder number 405200, SDG W0049, and sample B0BS63 was assigned to workorder number 405201, SDG W0060.

Gamma Spectroscopy

Gamma Scan by method ITAS-RD-3219
The Eu-152 radiochemical yield was low for the LCS (L052011S). The LCS was recounted and the recount results are acceptable and reported. The root cause of the low yield is insufficient Eu-152 in the LCS. The Calibration Control Group has been requested to prepare the gamma water vials with higher levels of Eu-152. The Eu-152 detection limit was not met for the duplicate of sample B0BS63. The Eu-152 detection limit was achieved in both the batch blank and the sample, therefore, the results are accepted and reported. The LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual limits, except as noted above.

Liquid Scintillation Counting

Technetium-99 by method ITAS-IT-RS-0001
The matrix spike, LCS, batch blank, sample and sample duplicate (duplicate of sample B0BS63) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Suzanne Gaines
Project Manager

8/16/94

0005

000032

Chain-of-Custody Information

Surveyed : Yes ✓ No ____? Less than 200 counts/minute: Yes ✓ No ____? By (initials) [illegible]

Pacific Northwest Laboratories Battelle Boulevard Richland, Washington 99352	**CHAIN OF CUSTODY**	Test User ID: BATTM167EE C-of-C: B013D1 pg. 1 of 1

Company Contact: BE OPITZ Telephone: (509) 372-0EE5

Samples Collected by: HANKEL (Assessed) Date: 5-6-94 Time: 830

ID/Sample No.: B0BS63

Ice Chest No.: EIR-11 Field Logbook Page No.: 4/865

Remarks: SAF 94-130

Possible Sample Hazard Identification: Contract No.:

Destination: DELIVER TO SIGMA 5 (WHC Contract) Carrier/Waybill No.:

Ground-Water X Soil ____ Other ____

Shipping container internal temperature when samples sealed in it ____. Shipping container internal temperature when opened in laboratory ____.

Sample Identification

B0BS63 -(8) 1000mlP-GAMM
B0BS63 -(2) 1000mlP-TC99 > 40520101

SDA
W0060

Chain of Possession

Hankel PNL Relinquished by:	[illegible] Received by:	1220 5/6/94 Date/Time:
O Mueller for TLV PNL Relinquished by:	L Sweeney WHC Received by:	5-10-94 - 0700 Date/Time:
L Sweeney WHC Relinquished by:	R. Boyd Received by:	5-10-94 1145 Date/Time:
Relinquished by:	Received by:	Date/Time:
Disposed by:	Disposal Method:	Date/Time:

PNL-MA-567, AD2 BD-1200-345 (12/92)

8/16/94

SAMPLE ANALYSIS ORDER
BATTELLE, PNL

ITAS

CONTRACT_____
CHAIN OF CUSTODY #: B013D1
SAMPLE ID(S): B0BS63
SAMPLE SCHEDULE DATE: 04/01/94
USER ID BATTM16229

SAF94-130

SAMPLE RECEIVER INITIAL / DATE:
_____ / DATE_____

WATER_X_ SOIL___ OTHER___

INTERNAL TEMPERATURE OF SHIPPING CONTAINER
UPON OPENING IN LABORATORY_____

BOTT#	BOTT TYPE	BOTT SIZE	# of BOTT	PRESERVAT	NOTES	# of SAMP	ANA_1	ANA_2	ANA_3	ANA_4	ANA_5	ANA_6	Filtered
123	P	1000	1	HNO3		8 +	GAMM						
313	P	1000	1	HNO3		2 +	GAMMA SCAN TC99 TC-99	98 4/19/94					

SAMPLE STATUS REPORT FOR E 6028. E-BLANK 2-E33-30 TIME: 5/ 6/94 14:56
DISPATCHED: 3/30/94 11:48 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/ 6/94 12:41

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
4271	TOT-ACT	< 5.00000E 01 pCi/G	N	Y	VOGEL

END OF REPORT

BOBR73
BOBR74
BOBR75
BOBR76
LCS
5/10/94

BOBS63
LCS
5/10/94

8/16/94 MM

~~0020~~

000036

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WHC		WSI-L-0518-37

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
ER Eng Support	Field & Analytical Supp	ER Field Sampling

The following items are to be shipped from ☒ Contractor ☐ Vendor

Routing ☒ Contractor ☐ Vendor

Shipped to	Off-site Custodian
IT Analytical Services 2800 George Washington Way Richland, WA 99352	Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 74 lbs.	Sample #: PCBSL2, PCPSL4 Cooler ID: EC 11 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs.	Sample #: Cooler ID: NA Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the 300 AREA

Bill of lading # NONE

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No	Date
[signature]	157792	5/10/94

Location of Property (Area & Bldg.)	Contact	Phone
300 BP-5	P. H. Butcher	(509) 376-4388

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
5-10-94	8B410 PLS3A	NA

Originated By	Date	Authorized By	Date
P H Butcher	5/10/94	P H Butcher	5-10-94

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[signature]	5/10/94

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No	Date Issued	Purchase Order No.	Date Issued
R Boyd JT				
Date 5-10-94 1145				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to:
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Green – Property Control Custodian (Issuing Office) Yellow – Retain Pink – Originator

5/16/94 0051-1

54-3000-479 (09/89)

000037

INTERNATIONAL TECHNOLOGY CORPORATION

Regional Office
2800 George Washington Way
Richland, Washington 99352

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

Date/Time Received 5-10-94 1145 Client Name WHC

Project/Client # SAF 94-130 Batch or Case # ______

Cooler ID (if noted on the outside of cooler) ER-11

1. Condition of shipping container? OK
2. Custody Seals on cooler intact? Yes ☑ No ☐
3. Custody Seals dated and signed? Yes ☑ No ☐
4. Chain of Custody record is taped on inside of cooler lid? Yes ☑ No ☐
5. Vermiculite/packing material is: Wet ☐ Dry ☑
6. Each sample is in a plastic bag? Yes ☑ No ☐
7. Number of sample containers in cooler: 20
8. Samples have: ____ tape ____ hazard labels ✓ custody seals ✓ appropriate sample labels
9. Samples are: ✓ in good condition ____ leaking ____ broken ____ have air bubbles ____ other
10. Coolant present? Yes ☑ No ☐

Sample temperature 3°

11. The following paperwork should be accounted for (N/A if not applicable):

    Chain of Custody #'(s) B01301, B01302

    Request for analysis #(s) N/A

    Airbill # N/A Carrier N/A

12. Have any anomalies been identified above? Yes ☐ No ☑
13. Memos have been initiated for all anomalies identified above? Yes ☐

Printed Name/Signature R. Boyd R. Boyd Date/Time 5-10-94 1145

FORM NO. LS-042, Rev.0, 2/94

8/16/94 ~~0022~~

000038

SAMPLE RECEIPT VARIANCE REPORT
ITAS-RICHLAND LABORATORY

WORK ORDER NUMBER:_____ DATE INITIATED: 5-10-94

INITIATED BY: Heidelberg

DATE/TIME OF SAMPLE (AND/OR RFA & COC) RECEIPT:_____

CLIENT SAMPLE NUMBER	RFA/COC NUMBERS	ANALYSIS REQUESTED
B0BS64	B013D2	γ, TC
B0BS63	B013D1	γ, TC

Samples were received with the following deficiencies:

☐ 1. Not enough sample received for proper analysis.
☐ 2. Sample received without proper preservative.
☐ 3. No sample received in container.
☐ 4. Sample received without a RFA/COC form.
☐ 5. No sample ID on container.
☐ 6. Sample received broken or leaking.
☐ 7. Holding time exceeded at receipt.
☐ 8. Custody tape broken.
☐ 9. COC not relinquished by client.
☐ 10. Sample information on container does not match sample information on the paper work (Explain below).
☐ 11. All shipping containers (coolers) on waybill not received with shipment.
  ☐ RFA/COC received
  ☐ RFA/COC not received
☒ 12. Other (Explain below).

NOTES: COC's came with Dest user ID of M16729 and SAF 94-130. Will log as WHC 94-130.

SUPERVISOR REVIEW:_____

PROJECT MANAGER REVIEW:_____

TELEPHONED TO: Joan Kessner ON 5/10 BY Van Pettey

TELEFAXED TO:_____ ON_____ BY_____

SIGNED ORIGINAL MUST BE RETAINED IN WORK ORDER FILE

FORM NO. LS-023, 3/92, Rev. 0

8/16/94
0023
000039

TENNELEC #1 SCREENING CALCULATION SPREADSHEET

All are Category 1.
JRM 11 May 94

Customer Code	Recieved Date	Time	Screening Prep Date	Time	Count Date	Mnts. Cntd	BACKGROUND Alpha	Beta	Mnts
BAT			51094		510	10	15	214	240

Customer ID BAT/WATER	pH <2 Rcvd/Reiq	RESIDUE Wght (mGrms)	Vol. Anal. mG mL	Sample Size Gm L	SMPLE CNT DATA Hldr Num.	Total Counts Alpha	Beta	Net Sample Counts/Minute Alpha	Beta	DPM / Aliqout Alpha	Beta	uCi per Sample Alpha	Beta	2 Sigma Error uCi per Sample Alpha	Beta	pCi/(Gm or L) Alpha	Beta	Category 1 Yes/No	Aliquot to Cat 1 Gm or Ltr Alpha	Beta
B0BS63		9.4	5	1.0	6	5	9	0.44	0.01	2.0E+00	-3E-01	1.8E-04	-3E-05	1.9E-07	-3E-08	1.8E+02	-3E+01	Yes	5.6E+01	-4E+03
B0BS64		4.8	5	1.0	7	2	35	0.14	2.61	4.9E-01	5.5E+00	4.4E-05	5.0E-04	9.2E-08	2.1E-07	4.4E+01	5.0E+02	Yes	2.3E+02	2.0E+02
B0BRQ5		4.1	5	1.0	8	0	13	-0.06	0.41	-3E-01	9.2E-01	-2E-05	8.3E-05	-6E-08	2.7E-07	-2E+01	8.3E+01	Yes	-4E+02	1.2E+03
B0BRN7		8.1	5	1.0	9	0	14	-0.06	0.51	-3E-01	1.1E+00	-3E-05	1.0E-04	-7E-08	3.5E-07	-3E+01	1.0E+02	Yes	-4E+02	9.7E+02
B0BRP9		7.0	5	1.0	10	1	8	0.04	-0.09	1.7E-01	-2E-01	1.5E-05	-2E-05	4.9E-08	-5E-08	1.5E+01	-2E+01	Yes	6.7E+02	-5E+03
B0BWB1		7.1	5	1.0	11	0	10	-0.06	0.11	-3E-01	2.8E-01	-2E-05	2.5E-05	-6E-08	4.3E-08	-2E+01	2.5E+01	Yes	-4E+02	4.0E+03
B0BW98		7.5	5	0.1	12	1	21	0.04	1.21	1.2E-01	2.6E+00	1.1E-06	2.3E-05	4.9E-09	2.8E-07	1.1E+01	2.3E+02	Yes	9.0E+02	4.3E+02
B0BW59		1.4	5	0.1	13	1	15	0.04	0.61	1.3E-01	1.3E+00	1.2E-06	1.1E-05	4.5E-09	9.4E-08	1.2E+01	1.1E+02	Yes	8.6E+02	8.7E+02
B0BW60		2.6	5	0.1	14	1	16	0.04	0.71	1.3E-01	1.5E+00	1.2E-06	1.3E-05	4.6E-09	1.2E-07	1.2E+01	1.3E+02	Yes	8.6E+02	7.4E+02
B0BWH3		6.2	5	4.0	15	2	17	0.14	0.81	5.6E-01	1.6E+00	2.0E-04	5.9E-04	3.8E-07	1.3E-06	5.1E+01	1.5E+02	Yes	2.0E+02	6.7E+02
B0BWJ0		1.6	5	4.0	16	1	16	0.04	0.71	1.3E-01	1.5E+00	4.5E-05	5.4E-04	1.8E-07	4.9E-06	1.1E+01	1.3E+02	Yes	8.8E+02	7.5E+02
B0BWG8		4.4	5	4.0	17	0	14	-0.06	0.51	-3E-01	1.1E+00	-1E-04	4.1E-04	-2E-07	1.5E-06	-2E+01	1.0E+02	Yes	-4E+02	9.8E+02
B0BWG6		1.2	5	4.0	18	0	9	-0.06	0.01	-2E-01	5.9E-02	-9E-05	2.1E-05	-2E-07	1.5E-08	-2E+01	5.3E+00	Yes	-5E+02	1.9E+04
B0BWH4		2.7	5	1.0	19	1	9	0.04	0.01	1.5E-01	-7E-03	1.4E-05	-7E-07	4.6E-08	-7E-10	1.4E+01	-7E-01	Yes	7.3E+02	-2E+05
B0BWH6		3.1	5	1.0	20	2	10	0.14	0.11	5.6E-01	1.4E-01	5.0E-05	1.3E-05	9.0E-08	1.1E-08	5.0E+01	1.3E+01	Yes	2.0E+02	8.0E+03
TOTAL	uCi							-0.06	-0.89	-2E-01	-2E+00	2.9E-04	2.3E-03	ERR	ERR	ERR	ERR	Yes	ERR	ERR

*** GAMMA ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD 11-May-1994

Page 1

CUSTOMER: WHC SAF SAMPLE DELIVERY GROUP W0060

MATRIX : WATER 94-130 BATCH NUMBER 5-201

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
	L0520101B	✓			
	L0520101S	✓			
1)	40520101 E0520101	✓	WHC	B0BS63	

ACTIONS (Initial & Date)

) INITIATED JH 5/12/94

) PREP LAB RECEIVED [initials] 6-10-94

) SAMPLE REMAINDER STORED [initials] 6-13-94

) SEPARATION LAB RECEIVED N/A

5) COUNTING/MEASUREMENT LAB OD 6/13/94

6) DATA REVIEWED AND ANALYTICAL PREP STORED [initials] 6/17/94

8/16/94 [initials]

~~0025~~

000041

INTERNATIONAL TECHNOLOGY CORPORATION

DUE DATE _____

REANALYSIS / RECOUNT

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

ANALYSIS Gamma

NAME/DATE nd / ~~6/15/94~~ 6/15/94

CUSTOMER WHC

SAMPLE DELIVERY GROUP W0060

MATRIX Water

BATCH NUMBER 5-201

ITAS ID	CUSTOMER ID	COMMENTS
1) L0520115	N/A	Reagent Spike
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

REANALYSIS

REFERENCED QC

ITAS ID - BLANK _____

ITAS ID - SPIKE _____

CLIENT CODE _____

ACTIONS (Initial & Date)

PREP LAB RECEIVED _____

SAMPLE REMAINDER
RETURNED TO SCG _____ ☐ (CHECK ONE)

NO SAMPLE REMAINING ☐

SEPARATION LAB _____

COUNTING/MEASUREMENT _____

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

RECOUNT

ACTIONS (Initial & Date)

COUNTING/MEASUREMENT MC 6-15-94

DATA REVIEWED _____

ANALYTICAL PREP STORED _____

ADDITIONAL COMMENTS:

RC-048 12/92 REV 0

000012

*** TC-99 ***

CHAIN-OF-CUSTODY BATCH ANALYSIS RECORD

11-May-1994
Page 1

CUSTOMER: WHC SAF SAMPLE DELIVERY GROUP W0520

MATRIX : WATER 94-130 BATCH NUMBER 5-201

	ITAS ID	DUP	ACCOUNT	CUSTOMER ID	COMMENTS
					EQNI 232 - 300.12 ± 3.7085 DPM
	L0520111N L0520112N		L0520111B	L0520111M	F0520101
	W0520101 - EQNI 231 - 300.58 ± 3.7141 DPM				
1)	40520101		WHC	B0BS63	

ACTIONS (Initial & Date)

1) INITIATED JH 5/12/94

2) PREP LAB RECEIVED 6/14/94 MM

3) SAMPLE REMAINDER STORED NA

4) SEPARATION LAB RECEIVED 6/14/94 MM

5) COUNTING/MEASUREMENT LAB 17 Jun 94 OA

6) DATA REVIEWED AND ANALYTICAL PREP STORED GR 6/22/94

8/16/94 MM

0027

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